18. A method of tracking a gaze position of an eye in a target space in a field of view of the eye over an eye tracking period, the method comprising:

    performing a plurality of scans of the eye with infrared light within the eye tracking period, each scan comprising:

        generating infrared light signals over a scan period; and

        projecting the infrared light signals from a number M of virtual light projectors to the eye to form the number M of illumination areas on the eye, wherein the number M>1;

    detecting reflections of the infrared light signals from the eye for each scan; and

    determining the gaze position of the eye in the target space from the detected reflections of the infrared light signals for each scan, wherein determining the gaze position of the eye in the target space from the detected reflections of the infrared light signals for each scan comprises:

    identifying a plurality of glints from the detected reflections of the infrared light signals for the scan, and

    upon identifying each glint:

        determining a glint center position of the glint relative to a scan space or a scan subspace; and

        transforming the glint center position from the scan space or the scan subspace to the gaze position in the target space.

19. An eye tracking system, comprising:

a scanning light projector to project visible light over a first period to at least one exit pupil formed proximate an eye in a target space to form a virtual display in the target space, wherein the scanning light projector is further to generate infrared light over a second period overlapping the first period;

an optical splitter having a number M of optical elements forming M virtual light projectors, wherein the number M>1, each of the M virtual light projectors to project, over the second period for a plurality of scans of the eye, at least a portion of the infrared light to the eye to form the number M of illumination areas on the eye;

an infrared detector to detect reflections of the infrared light from the eye for each scan; and

a processor that is communicatively coupled to the scanning light projector and the infrared detector, the processor to

    determine a gaze position of the eye in the target space from the detected reflections of the infrared light for each scan, wherein the processor is to determine the gaze position of the eye for each scan by:

    identifying a plurality of glints from the detected reflections of the infrared light for the scan; and

    determining the gaze position relative to the target space based on the identified plurality of glints,

    wherein the processor is further to selectively adjust the virtual display in the target space based on the gaze position.

20. The eye tracking system of claim 19, wherein the processor is further to: determine a trajectory of the gaze position of the eye from the detected reflections of the infrared light for each scan.

21. The eye tracking system of claim 20, wherein a plurality of exit pupils are formed proximate the eye, and wherein the processor is further to:

    selectively enable or disable the exit pupils to receive a portion of the visible light based on the trajectory of the gaze position.

22. An eye tracking system, comprising:

a scanning light projector to generate infrared light signals during a plurality of scan periods;

an optical splitter having a number M of optical elements forming M virtual light projectors, each of the M virtual light projectors to project, for each scan period, the infrared light signals to an eye in a target space to form the number M of illumination areas on the eye, wherein the number M>1;

an infrared detector to detect reflections of the infrared light signals from the eye for each scan; and

a processor that is communicatively coupled to the scanning light projector and the infrared detector, the processor to

    determine a gaze position of the eye in the target space from the detected reflections of the infrared light signals for each scan, wherein the processor is to determine the gaze position of the eye for each scan by:

    identifying a plurality of glints from the detected reflections of the infrared light signals for the scan, each glint associated with one of a plurality of scan subspaces; and

    determine a glint center position of each glint in a respective scan subspace; and

    determine the gaze position relative to the target space based on the glint center positions.

23. An eye tracking system, comprising:

a scanning light projector to generate infrared light signals during a plurality of scan periods;

an optical splitter having a number M of optical elements forming M virtual light projectors, each of the M virtual light projectors to project, for each scan period, the infrared light signals to an eye in a target space to form the number M of illumination areas on the eye, wherein the number M>1;

an infrared detector to detect reflections of the infrared light signals from the eye for each scan; and

a processor that is communicatively coupled to the scanning light projector and the infrared detector, the processor to

    determine a gaze position of the eye in the target space from the detected reflections of the infrared light signals for each scan, wherein the processor is to determine the gaze position of the eye for each scan by:

    identifying a plurality of glints from the detected reflections of the infrared light signals for the scan; and

    upon identifying each glint:

    determine a glint center position of the glint relative to a scan space or a scan subspace; and

    transform the glint center position from the scan space or the scan subspace to the gaze position in the target space.

* * * * *